

Appl. No. 10/648,594
Amdt. Dated Oct. 8, 2004
Reply to Office Action of September 27, 2004

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. Claim 1 (original): A thermal interface material comprising:

a polymer matrix having a thermally conductive first face and an opposite thermally conductive second face; and

a plurality of carbon nanocapsules incorporated in the polymer matrix.

Claim 2 (original): The thermal interface material as recited in claim 1, wherein the polymer is generally a reaction product of a polyether polyol and an isocyanate.

Claim 3 (original): The thermal interface material as recited in claim 2, wherein a molecular weight of the polyether polyol is in the range from 500 to 5000.

Claim 4 (original): The thermal interface material as recited in claim 2, wherein a functionality of the polyether polyol is in the range from 3 to 9.

Claim 5 (original): The thermal interface material as recited in claim 2, wherein a molecular weight of the isocyanate is in the range from 200 to 800.

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Claim 6 (original): The thermal interface material as recited in claim 2, wherein a functionality of the isocyanate is in the range from 2 to 6.

Claim 7 (original): The thermal interface material as recited in claim 1, wherein a diameter of each carbon nanocapsule is in the range from 5 to 50nm.

Claim 8 (original): The thermal interface material as recited in claim 1, wherein the carbon nanocapsules are enclosed with thermally conductive material.

Claim 9 (original): The thermal interface material as recited in claim 8, wherein the thermally conductive material comprises indium and/or copper.

Claim 10 (original): The thermal interface material as recited in claim 1, wherein the carbon nanocapsules are filled with metal nano-grains.

Claim 11 (original): The thermal interface material as recited in claim 10, wherein the metal nano-grains comprise silver, copper and/or phosphor bronze.

Claim 12 (withdrawn): An electronic assembly comprising:

a heat resource defining a first plane;

a heat sink defining a second plane immediately opposite to and parallel to said first plane;

a thermal interface material sealing a gap between said first and second planes;

wherein said thermal interface material is essentially composed of a plurality of carbon nanocapsules embedded within a solid polymer matrix.

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Claim 13 (withdrawn): The electronic assembly as recited in claim 12, wherein a diameter of each carbon nanocapsule is in the range from 5 to 50nm.

Claim 14 (withdrawn): The electronic assembly as recited in claim 12, wherein the carbon nanocapsules are covered with a thermally conductive material.

Claim 15 (withdrawn): The electronic assembly as recited in claim 14, wherein the thermally conductive material comprises indium and/or copper.

Claim 16 (withdrawn): The electronic assembly as recited in claim 12, wherein the carbon nanocapsules are filled with metal nano-grains.

Claim 17 (withdrawn): The electronic assembly as recited in claim 16, wherein the metal nano-grains comprise silver, copper and/or phosphor bronze.

Claim 18 (withdrawn): A method of making an electrical assembly comprising:

providing a first plane obtaining heat from a heat source;

providing a second plane oppositely parallel to said first plane for transferring said heat to a heat sink; and

providing a thermal interface material sealing a gap between said first and second planes for transferring said heat from the first plane to the second plane; wherein

said thermal interface material comprises a plurality of carbon nanocapsules embedded in a solid while resiliently compressed material layer.

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Claim 19 (withdrawn): The assembly recited in claim 18, wherein said layer is defined by a polymer matrix.